



Cylinder Wake Feedback Control

Flow Visualization and Open Loop PIV Results

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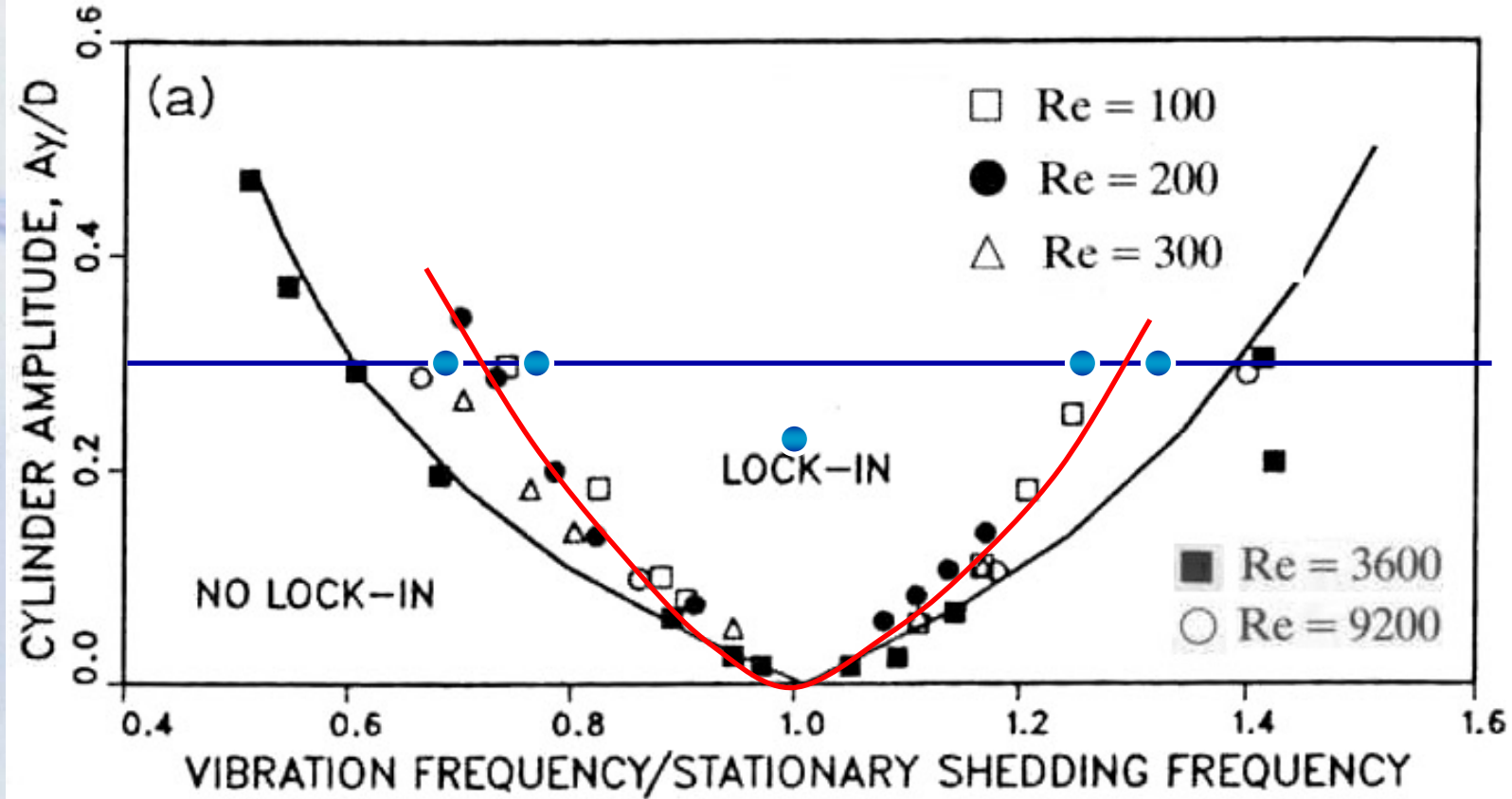


Flow Vis Parameters

- $Re = 120$
- Cylinder Diameter $D = 4.97 \text{ mm}$
- Forcing Amplitude $A/D = 30\%$ (1.49 mm pk)



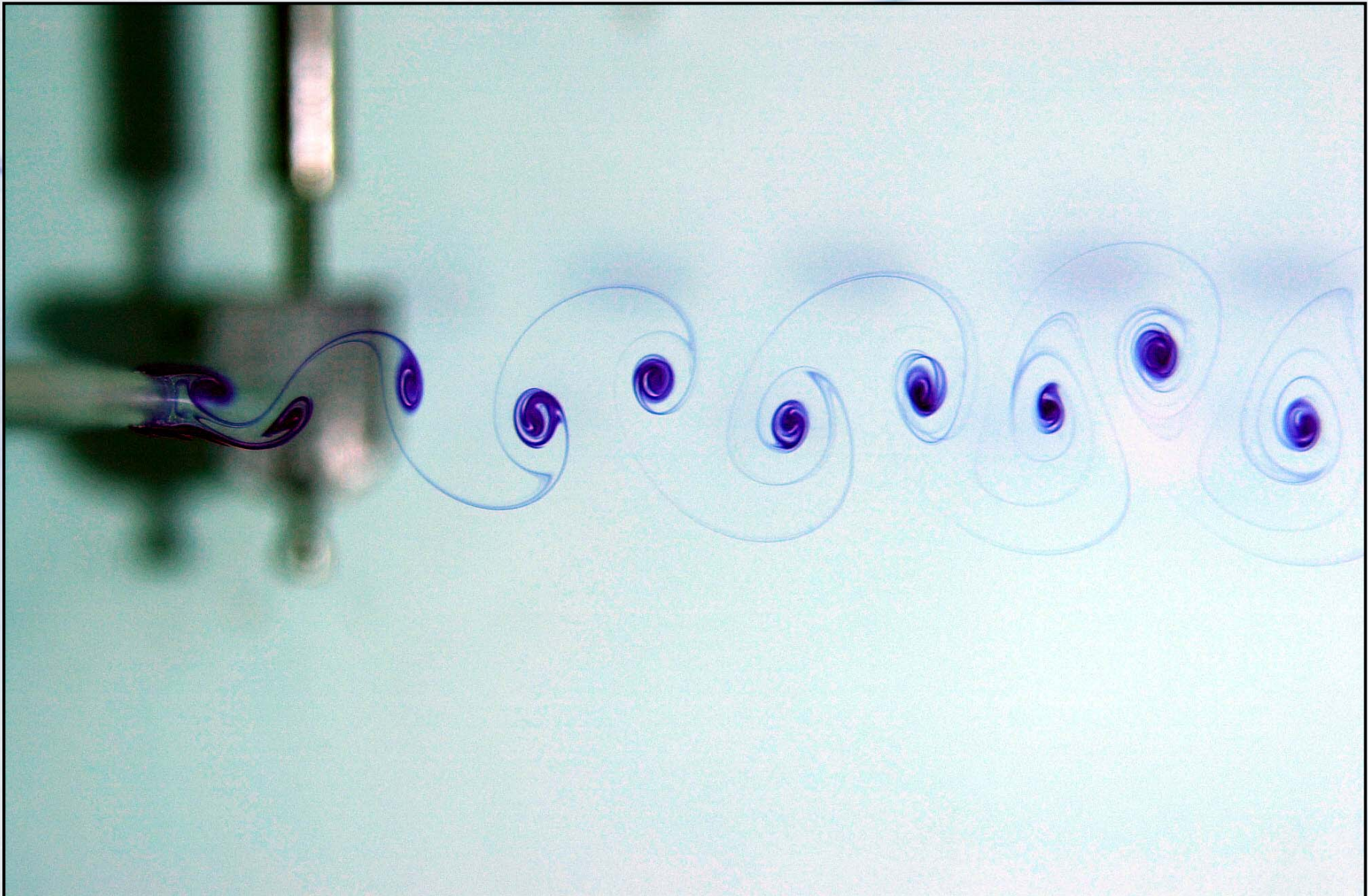
Literature: Lock-In Range



Source: Robert Blevins, 1990, "Flow-Induced Vibration", 2nd Edition, Van Nostrand Reinhold, pp 55.



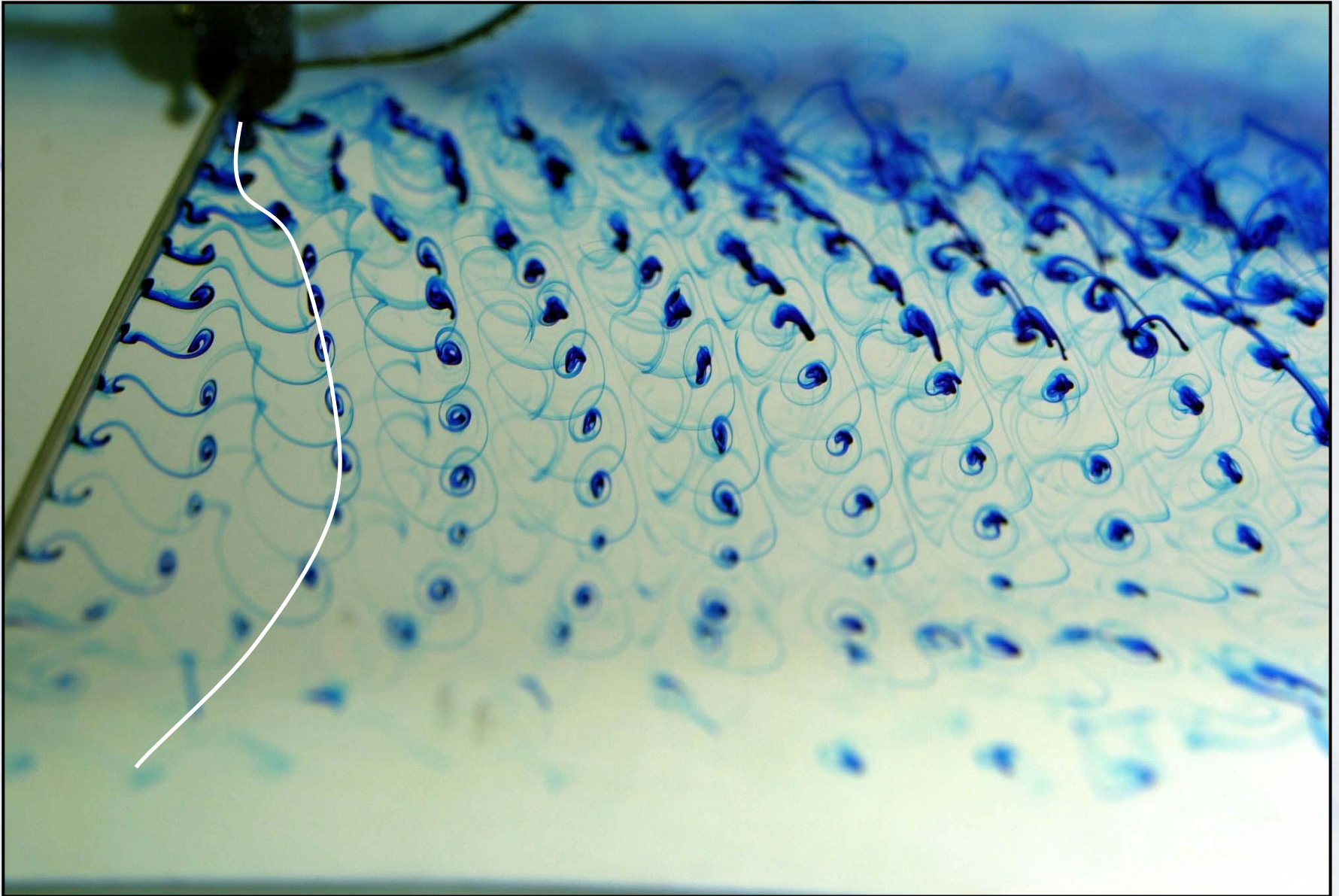
Unforced Center Line



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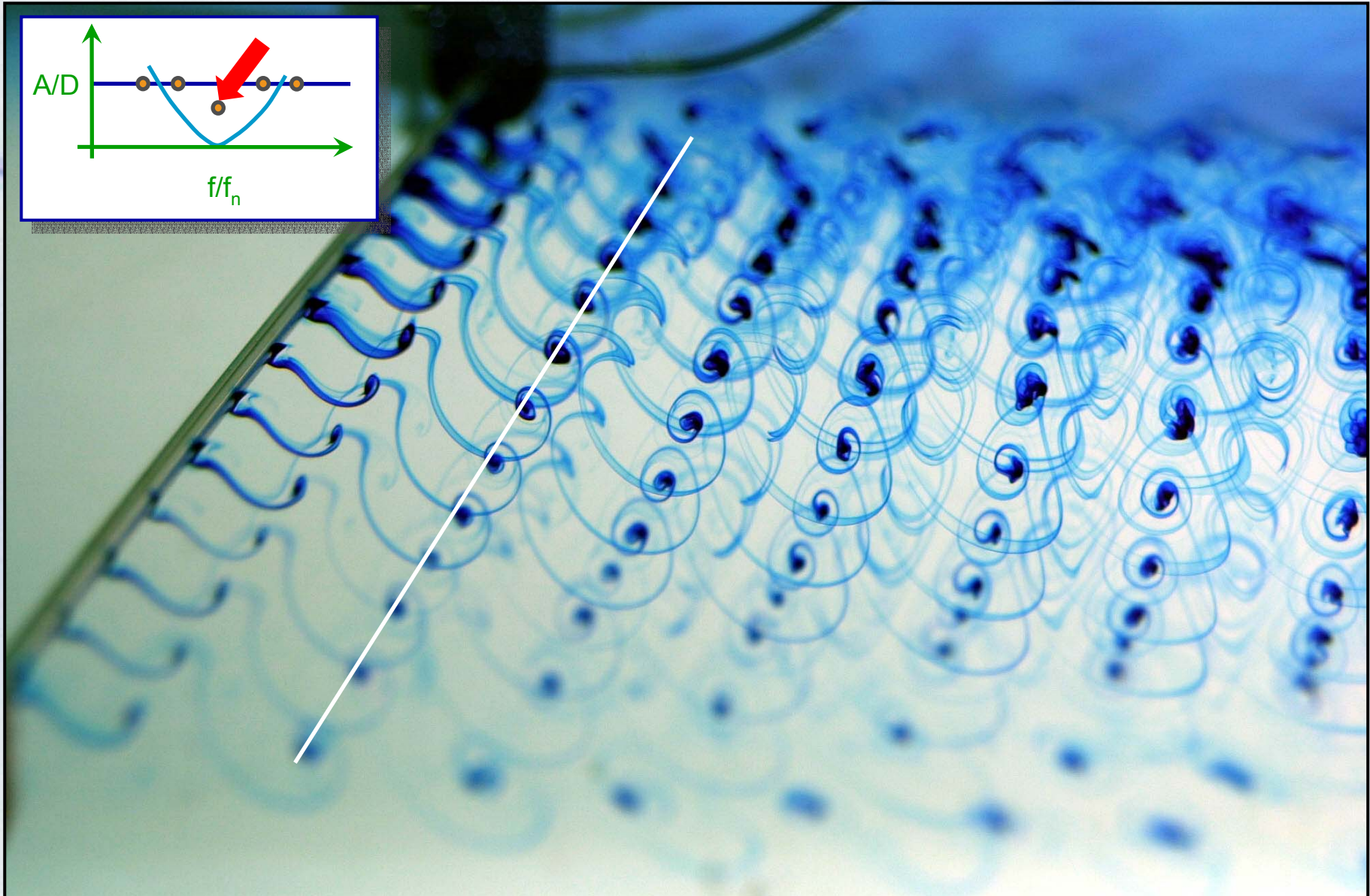
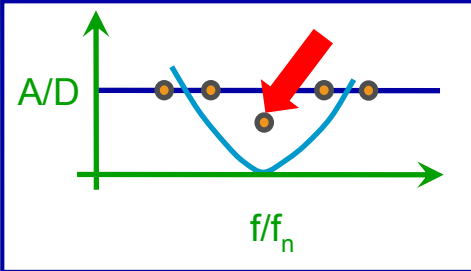
Unforced Entire Span



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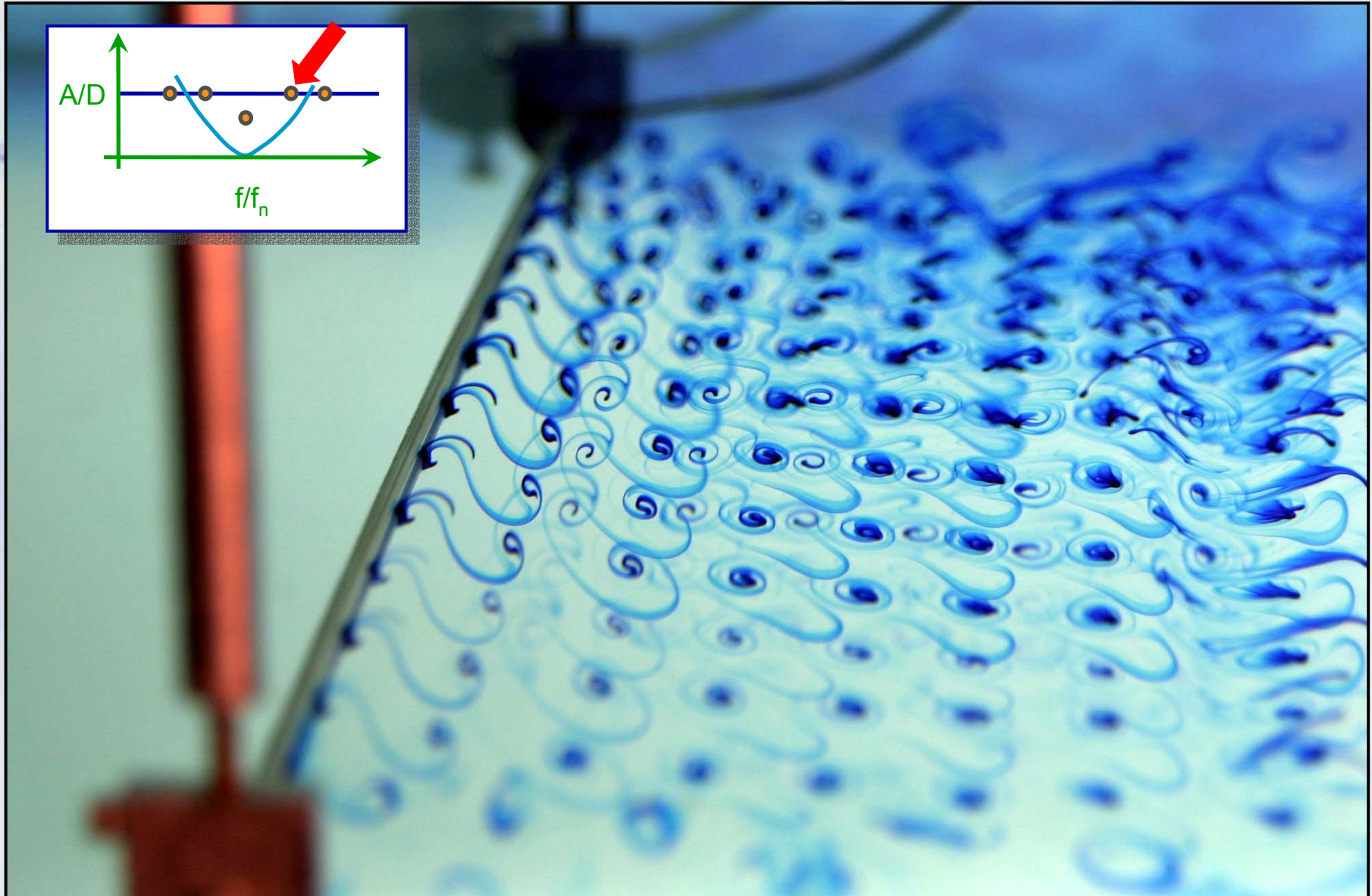
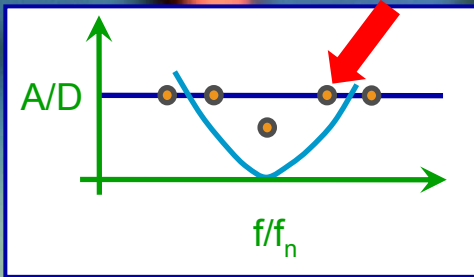
Forced $St/St_n = 1$, $A/D = 20\%$



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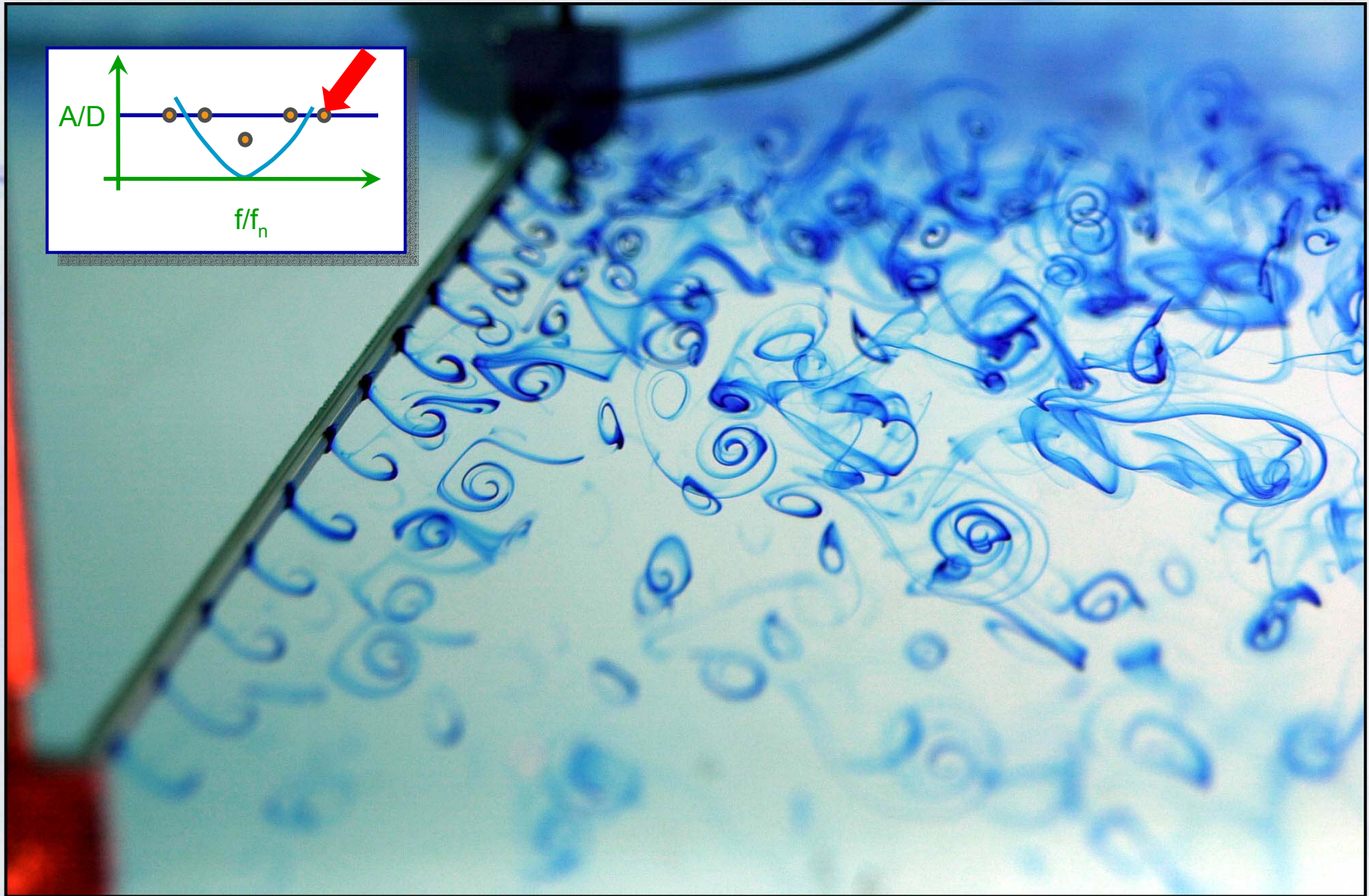
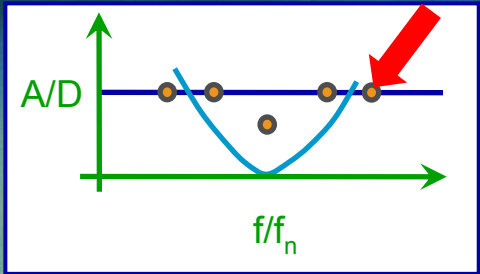
Forced $St/St_n = 1.20$, $A/D = 30\%$



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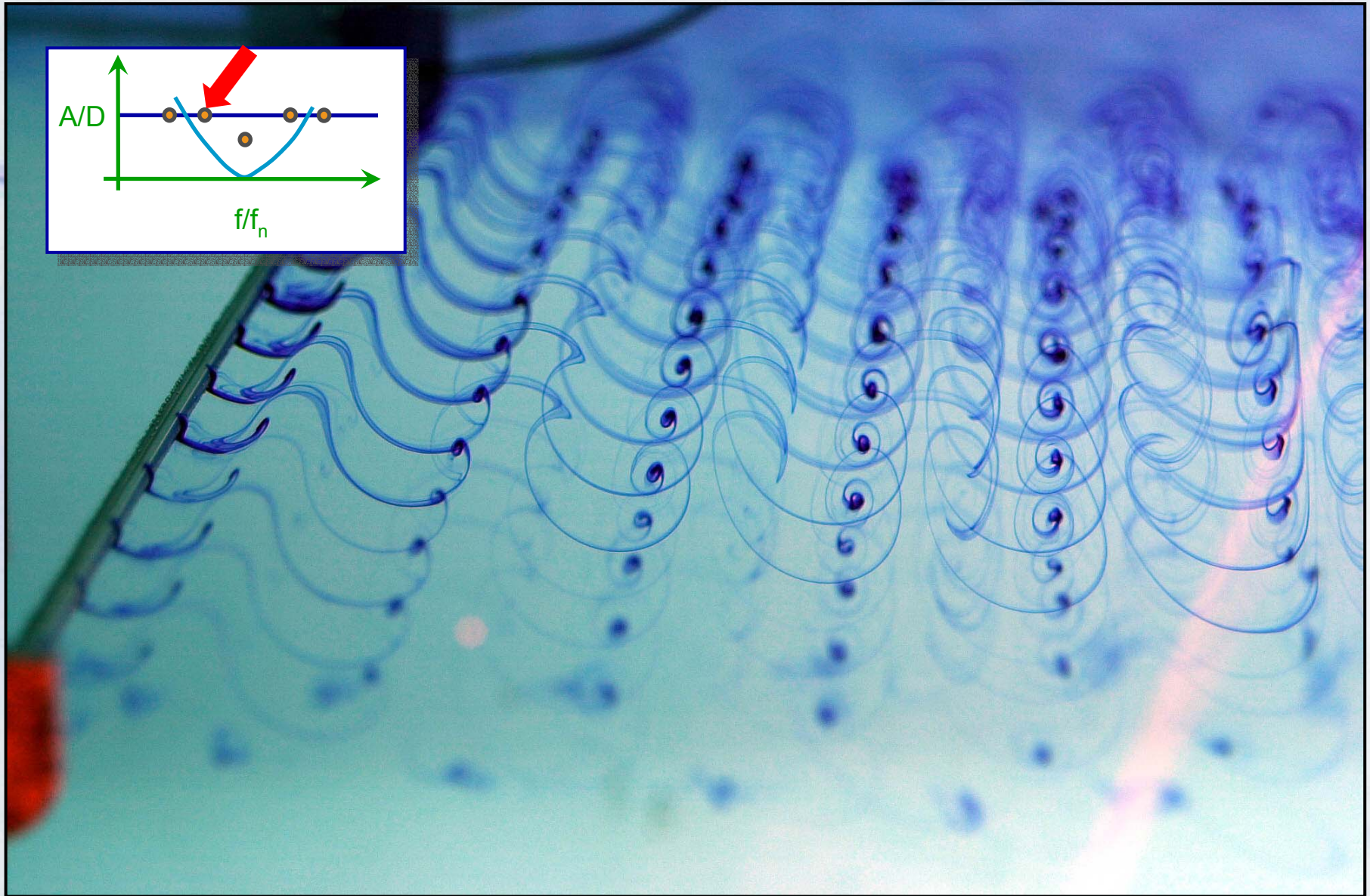
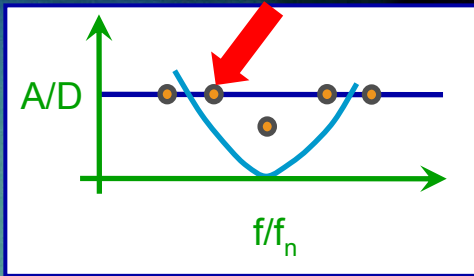
Forced $St/St_n = 1.26$, $A/D = 30\%$



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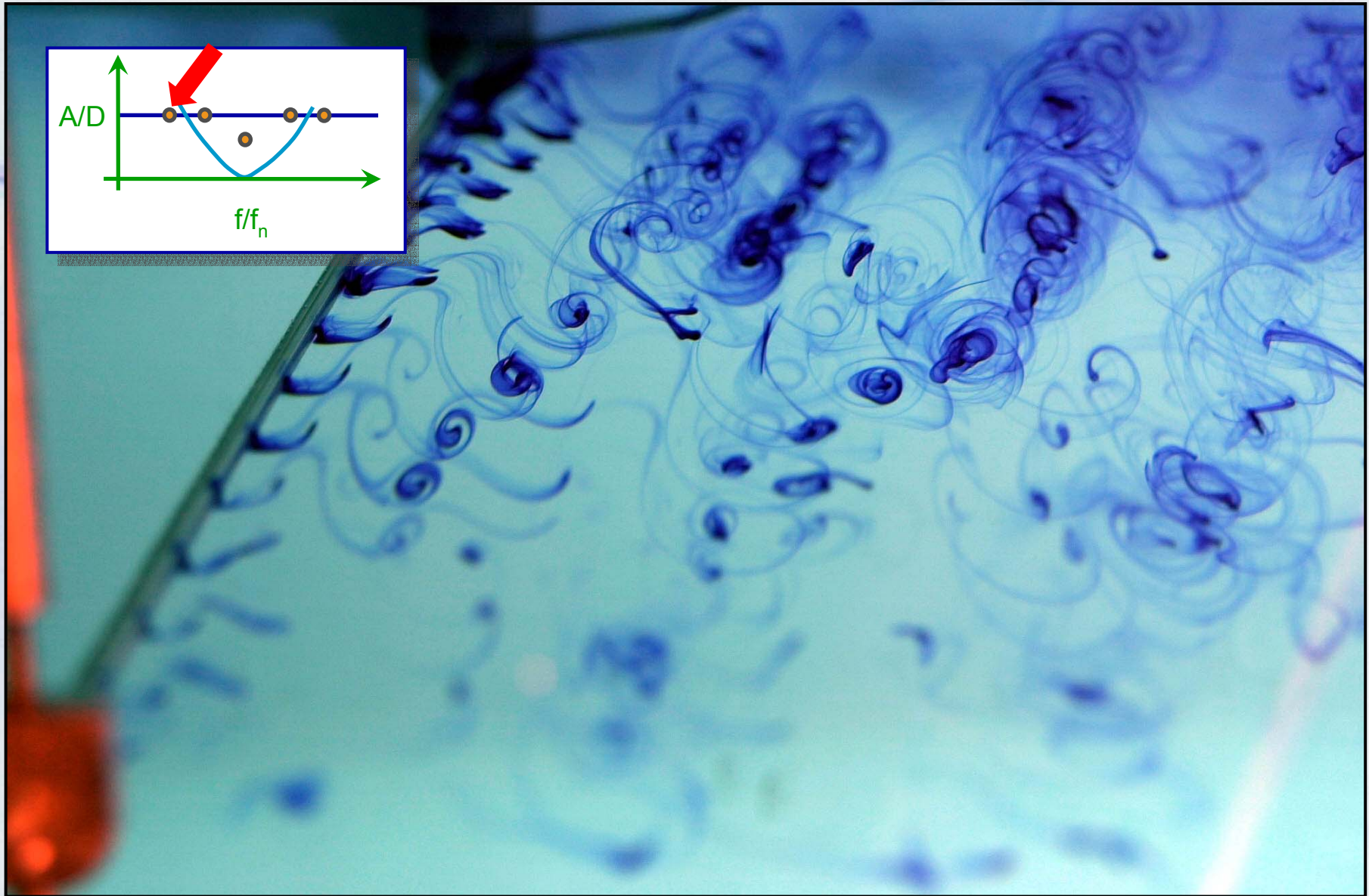
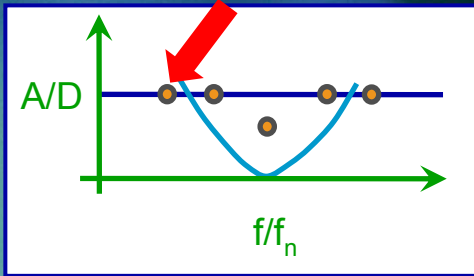


Forced $St/St_n = 0.83$, $A/D = 30\%$





Forced $St/St_n = 0.70$, $A/D = 30\%$



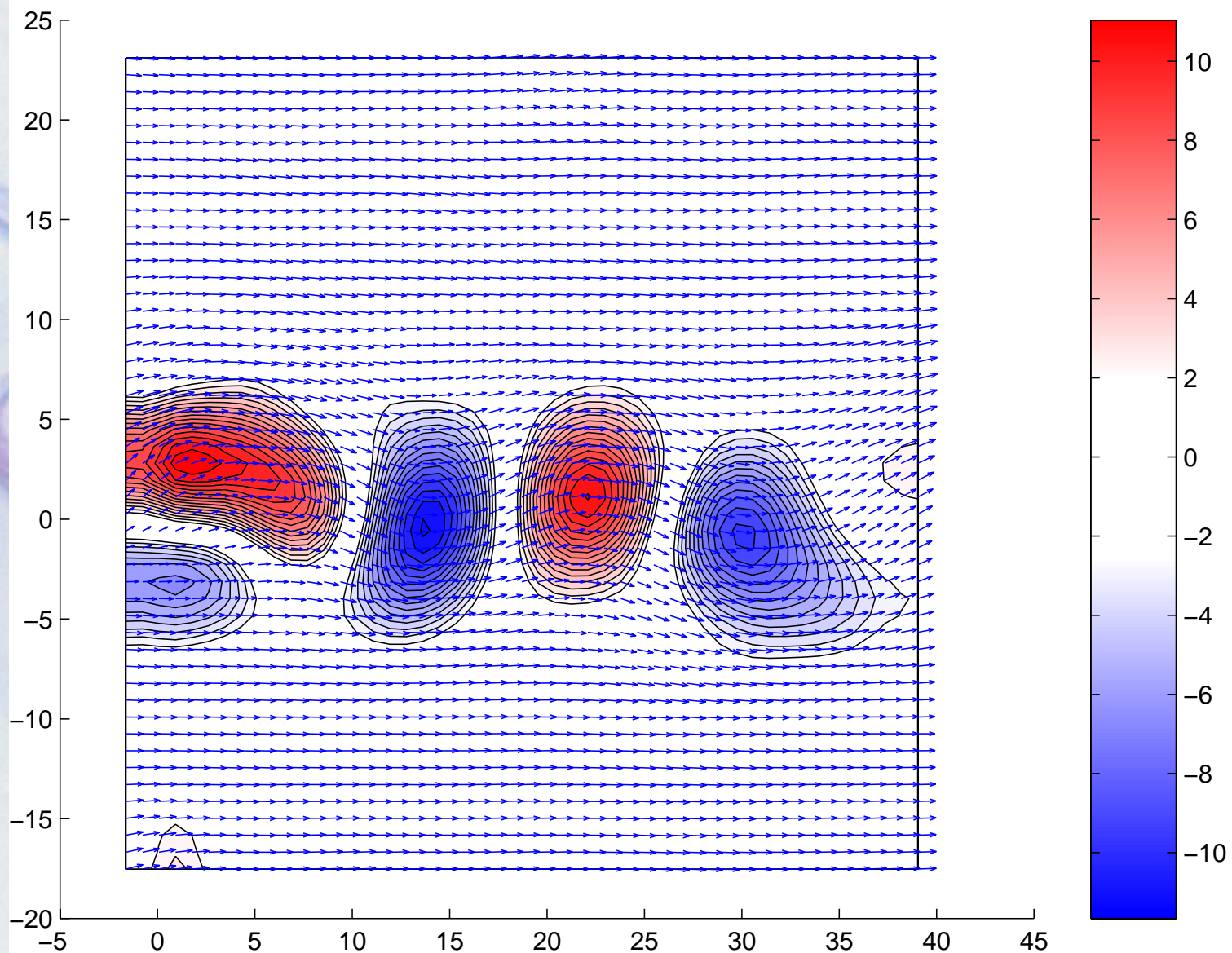


Conclusions Flow Vis

- Forcing increases spanwise coherence of the Karman Vortex Street
- Lock-in to forcing could be achieved in a range of $\pm 23\%$ around the natural vortex shedding frequency of $St = 0.2$, for a forcing amplitude of $A/D = 30\%$
- These results agree well with the published literature



Preliminary PIV Measurements



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